REMARKS

The Examiner is thanked for the comments in the Action. They have helped us considerably in understanding her rationale therein and in drafting this Response thereto.

It is our understanding that claims 1-14 remain pending in this application.

Preliminary items (the Examiner's Remarks):

The Action states: "*The applicant is respectfully noted that the amendments to the specification and the abstract are not complied with the rule they are therefore NOT ENTERED.*" The Examiner's points here are well taken. Amendments in proper form are made herein.

The Action here further states: "*The objections to the drawings set forth in the previous Office Action dated May 21, 2003 still HOLDS,*" wherein the prior previous Action states "*The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "16" and "19" have both been used to designate "cavity"*" Respectfully, this is error.

The cited authority, 37 CFR 1.84(p)(4), states "*The same part of an invention appearing in more than one view of the drawing must always be designated by the same reference character, ...*" In the present case, however, a "*cavity 16*" and a "*medium of variable index of refraction 19*" represent different parts. With reference to FIG. 4, the "*medium of variable index of refraction 19*" is located within the "*cavity 16,*" but only has specific relevance to that portion of the "*cavity 16*" through which the "*transmitted beam 39*" passes. For instance, in FIG. 4 the "*cavity 16*" is notably larger than needed for the "*transmitted beam 39*" and to treat the "*cavity 16*" and the "*medium of variable index of refraction 19*" as synonymous would be incorrect.

The Action here also states: "*The objections to the specification set forth in the previous Office Action still HOLDS.*" Applicant is confused by this. Is it a partial restatement of the first remark we discuss above. If so, we urge that the noted amendments cure this as well. In the alternative, we request clarification so that we may appropriately respond.

We proceed now with reference specifically to the numbered items in the Action.

Items 1, 3, 7, 10 and 11:

These appear informational in nature and are understood to require no reply.

Item 2 (35 USC § 102(e) rejections):

Claims 1, 4, 5, 6, 9, 10, 13, and 14 are rejected as being anticipated by Ip. Respectfully, this is error. A *prima facie* case for anticipation requires that a reference show all of the claimed structural features and how they are put together. We submit that the Actions either do not state a *prima facie* case for anticipation or else state one that cannot obtain.

The Action states "*The reasons for rejection are set forth in the previous Office Action dated May 21, 2003.*" Applicant again asserts that there are several errors in the statement of reasons, and asks reconsideration.

The claimed invention here is a wavelength reference and methods of producing such (see e.g., any independent claim preamble). In contrast, the Actions state: *Ip teaches a spectral equalizer (100. Figure 1) for multiplexed channels wherein the spectral equalizer comprises a Fabry Perot etalon ....*" We agree that Ip teaches a spectral equalizer – a device having different purpose, principles of operation, and structural features than Applicant's wavelength reference. As for Ip's "*spectral equalizer* [being] *for multiplexed channels*," this actually supports the claimed invention being distinct from IP.

The claims recite a "*gas-tunable etalon*" and etalons which include "*a gas-tunable medium.*" Whereas, the Actions state "*Ip teaches that the cavity may be filled with gas wherein by varying the density or composition due to changes in pressure, temperature or humidity the refractive index of the gas can be varied to tune the resonance and anti-resonance wavelengths of the etalon, (please see column 5, lines 20-28).*"

The Actions poorly paraphrase and largely overlook what Ip actually teaches. At col. 5, lines 20-28 Ip states:

> *The* [etalon] *cavity ... can contain air or another light transmissive medium having a different refraction coefficient than air such as glass, liquid crystal or sealed gas. In embodiments wherein air or another gas is used ..., a change in density or composition--due to changes in pressure, temperature, or humidity--will affect the refractive index of the air or other gas, affecting the resonance and anti-resonance wavelengths. Thus, it is preferred to have the gas sealed or controlled to prevent wavelength drifting.* (emphasis added)

Without hindsight based upon Applicant's disclosure, one of ordinary skill in the art would clearly read Ip here to merely be teaching that gas-based instances of its etalons be sealed to protect against unwanted effects "*due to changes in pressure, temperature, or humidity.*" Ip does

not teach or reasonably suggest a "*gas-tunable etalon*" or etalons which include "*a gas-tunable medium.*" In fact, Ip teaches the opposite and thus teaches away from the present invention.

Claims 1, 13 and 14 also recite "*at least one reflecting surface pair*" and "*a pair of reflecting surfaces.*" The Actions state, "[the etalon] *is comprised of a pair of partially reflective surfaces (13 and 14) separated by a distance d to form a light transmissive resonating cavity (15).*" When taken out of context the same can be said of virtually all etalons, but the complete teachings of Ip have particularly been overlooked here. Ip states "*For best spectral equalization results, the spectral response R of the etalon 10 ... is optimized by adjusting the reflectivity of the reflective surfaces 13 and 14*" (col. 4, lines 55-57). This is a limitation in Ip's spectral equalizer that is not present in the claimed invention.

The Actions go on to state:

> *Ip further teaches that by varying the properties therefore the refractive index of the gas, the Fabry Perot etalon can be tuned to align with predetermined channel spacing such as ITU channel plan, that serves as the standard wavelength, (please see column 5. lines 15-19). The gas is then sealed within the cavity so that the refractive index of the gas is fixed, (please see column 5, line 27-30). The spectral equalizer with the Fabry Perot etalon therefore provides a wavelength reference.* (emphasis in the original)

However, IP at col. 5 lines 15-19 merely states "*For example, the ITU channel plan has a 100 GHz frequency grid, requiring an FSR value of substantially 100 GHz.*" This in no way contradicts Ip's teachings in the very same paragraph regarding tuning. That being, "*the effective distance of the path taken by the light entering the etalon can be varied by changing the dimension d of the cavity*" (col. 5, lines 2-5) and "*alternately, the input angle of an incident light beam entering the etalon 10 can be adjusted*" (col. 5, lines 5-6) and that "*Using either of such tuning techniques, spacing ...can be aligned...with a predetermined channel spacing*" (col. 5, lines 11-14). Neither of these is the principle of operation of the claimed invention, as the Action wrongly asserts.

The cite to col. 5 lines 15-19 also in no way contradicts Ip's teachings in the very next paragraph (col. 5, lines 27-28) of how it prevents wavelength drift, in a manner that is irreconcilable with the claimed invention.

Thus, while Ip's spectral equalizer can work with the ITU plan to equalize the amplitudes, one of ordinary skill in the art would still appreciate that Ip has merely taught that surface spacing and/or surface orientation to an incident beam can be used for this. In fact, the

respective inventions of Ip and Applicant could be used together, Applicant's to precisely tune beam wavelengths to the ITU grid and Ip's to equalize the spectrum of beam amplitudes.

In sum, due to their different functions, Ip and the claimed invention use different principles of operation and have multiple structural features that differ.

The Actions continue "*With regard to claims 5 and 10, Ip teaches that the reflective surfaces (13 and 14) are partially reflective which means they are partially transmissive, (please see column 3, lines 29-30).*" We generally agree, but there has perhaps been some misunderstanding we should clarify. A totally transmissive or a totally reflective etalon cannot be constructed. But consider, for instance, the mirroring used in a ruby rod or most gas lasers. One mirror is totally reflective and one mirror is partially transmissive, thereby permitting the beam to ultimately exit. The statement here is correct, but these claims should be allowable for at least the reasons already discussed for their parent claims.

The Action continues "*With regard to claims 13 and 14, Ip teaches that the gas is sealed within the cavity (15), wherein the cavity as shown in Figure 1 comprises enclosure walls that form sealable enclosure.*" These claims should also be allowable for at least the reasons already discussed for their parent claims.

Item 4 (35 USC § 103(a) rejections 1 of 2):

Claims 2-3 and 7-8 are rejected as being unpatentable (obvious) over Ip in view of the Japanese Patent by Tachikawa et al (JP401250833A) (Tachikawa).

The reasons for rejection are set forth in the previous Office Action dated May 21, 2003.

The Actions here state "*The spectral equalizer that is comprised of a Fabry Perot etalon taught by Ip as described for claims 1 and 6 above has met all the limitations of the claims. Ip teaches that the properties of the gas within the cavity of the etalon. such as the pressure, temperature or humid may be changed in order to tune the etalon.*" However, as we have shown above, this is not the case. Furthermore, Tachikawa does not cover where Ip is relied upon to maintain this rejection. Accordingly, these claims should also be allowable for at least the reasons already discussed for their parent claims.

The Actions continue:

> *However* [Ip] *does not teach explicitly to include an enclosure surrounding the cavity that is filled with the gas. Tachikawa et al in the same field of endeavor teaches an arrangement and method to vary the properties such as*

> *pressure or temperature of the gas medium in the cavity of a Fabry Perot etalon wherein a container (3. Figure 1) serves as the enclosure that is filled with the gas surrounds the cavity (2) formed by the reflective plates. By varying the properties of the gas in the container the refractive index of the gas in the cavity is varied so that the etalon is tuned.*

Respectfully, this statement includes numerous errors. To the extent Tachikawa teaches any intentional variation in pressure, it is to vacuum pump a chamber containing an interferometer to remove air and replace it with Helium. Accordingly, pressure variation is not being used for tuning. Tachikawa also does not teach intentionally varying temperature, as the statement above implies. The only property of the gas that Tachikawa teaches intentionally changing is replacing air with Helium, because Helium has a lower refractive index than air. Tachikawa teaches that this is done so that unintentional changes in pressure and temperature produce smaller wavelength measurement error.

One of ordinary skill in the art will appreciate that Tachikawa is teaching an approach totally opposite Applicant's. Rather than affirmatively tune out error, Tachikawa accepts error as inherent and teaches a design to minimize its effect.

As noted above, the principles of operation Ip teaches are varying reflective surface separation and adjusting incident light beam angle relative to the reflective surfaces (col. 5, lines 2-6 and lines 12-17). The principle of operation Tachikawa teaches is use of a low refractive index medium to reduce the effect of error. Neither Ip or Tachikawa teach or reasonably suggest the principle of operation of the claimed invention, pressure tuning.

As has long been established:

> *To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.* MPEP §2142

The prima facie case for obviousness has not been met here because the rejection fails to meet all three of the above criteria. First, Ip and Tachikawa do not suggest combining their respectively different approaches in any manner that could read on Applicants still different approach. MPEP 2143.01 provides this guidance:

> *If a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. In re Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).*
>
> *If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. In re Ratti, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).*

Second, a combination of Ip and Tachikawa would provide no reasonable expectation of success. Such a combination would reduce any ability to tune, since the low refractive index medium of Tachikawa would reduce the effect of IP's varying surface separation or adjusting beam angle. Third, the combination of Ip and Tachikawa does not teach or suggest all of the claim limitations, as discussed above for this item.

Item 5 (35 USC § 103(a) rejections 2 of 2):

Claims 11-12 are rejected as being unpatentable (obvious) over Ip in view of the Japanese Patent by Tachikawa et al (JP401250833A) (Tachikawa).

The reasons for rejection are set forth in the previous Office Action dated May 21, 2003.

The Actions here first restates remarks about Ip in Item 2 (used for § 102(e) rejections), and we have shown above that those remarks are error based on misinterpretation. The statement here then ends with the additional statement "*It would have been obvious to one skilled in the art to vary both the pressure and the composition to vary the refractive index of the gas for the benefit of adding more degrees of control to tune the etalon.*" This statement appears to concede that Ip does not teach varying pressure (or temperature). The apparent rationale here is that the two means of tuning Ip does teach are not enough and that it would be obvious to add the additional means of varying pressure or temperature to achieve more degrees of control. This is illogical, however, because it relies on one of ordinary skill in the art appreciating that Ip is inadequate for solving the very problem it purportedly solves. Additionally, as quoted above for Item 4, MPEP §2142 guides us that "*The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.*" That the combination of Ip and Tachikawa need or would provide "*more degrees of control*" is not suggested in these references. It is pure speculation and it is wrong because the combination would actually provide less control, as already discussed.

The Actions continue:

> *Tachikawa et al in the same field of endeavor teaches an arrangement and method to vary the properties such as pressure or temperature of the gas medium in the cavity of a Fabry Perot etalon wherein a container (3, Figure 1) serves as the enclosure that is filled with the gas surrounds the cavity (2) formed by the reflective plates. By varying the properties of the gas in the container the refractive index of the gas in the cavity is varied so that the etalon is tuned.*

However, Tachikawa does not teach or suggest intentionally varying pressure. It teaches the use of a low refractive index medium to minimize error due to pressure or temperature changes. Tachikawa thus does not teach or suggest tuning – it teaches error reduction so that tuning is not needed. And the Actions continue:

> *It would then have been obvious to one skilled in the art to apply the teachings of Tachikawa et al to modify the spectral equalizer of Ip for the benefit of providing a buffer environment as intermediate means to vary the properties of the gas in the etalon so that the variation of the refractive index of the etalon therefore the tuning of the etalon could be conducted in more accurately controlled manner.*

Respectfully, "*providing a buffer environment as intermediate means*" is mere speculation, and even then has nothing whatsoever to do with Applicant's claims 11 and 12. As for combining Ip and Tachikawa for "*tuning of the etalon ... in more accurately controlled manner,*" the approaches Ip does teach would be more fine if performed also using the approach Tachikawa teaches, but only at the cost of tuning range. But there is no suggestion in these references to combine them to achieve this; the approaches used still would not be that used by Applicant; and this is also mere speculation and has nothing whatsoever to do with Applicant's claims 11 and 12.

Items 6 and 9 (Double Patenting and Terminal Disclaimer):

Claims 1-14 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-4, 9, 12-16 and 22 of U.S. Patent No. 6,552,856.

Applicant attempted to address this with a terminal disclaimer submitted with our last Response, but that document seems to have gone awry. A new copy is enclosed herewith.

Item 8 (Response to Arguments):

The latest Action here states:

> *In response to applicant's arguments which state the cited Ip reference only teaches to tune the etalon by either changing the effective distance or spacing between the two reflective plates or by changing the angle of incident of the light beam and has not taught to tune the etalon by changing refractive index of the gas medium within etalon, therefore differs from the instant application, the examiner respectfully disagrees for the reasons stated below. The examiner respectfully directs the applicant's attention to the paragraph in column 5 lines 19-40 of the cited Ip reference. It reads specifically*
>
> > *"The cavity 15 in alternative embodiments of the invention can contain air or another light transmissive medium having a different refraction coefficient than air such as glass, liquid crystal or sealed gas. In embodiment wherein air or another gas is used in the gap between the reflective surfaces 13 and 14, a change in density or composition- due to changes in pressure, temperature, or humidity, will affect the refractive index of the air or other gas, affecting the resonance and anti-resonance wavelength."*

Respectfully, the cite does not teach intentionally using pressure to tune. It teaches that changes in pressure, temperature, or humidity may adversely effect the invention of Ip when a gas is used as the medium. Without hindsight based on Applicant's disclosure, one of ordinary skill in the art would read nothing more into this.

The latest Action continues:

> *The cited reference specifically teaches that the* [SIC] *by changing the refractive index of the gas in the cavity, either by changing density or composition of the gas, the resonance condition of the cavity change. Resonance condition is the crucial condition and the only condition matters for defining and tuning an etalon. This reference therefore reads on and meets the claims of the instant application.*

Respectfully, we disagree. The reference merely acknowledges the well known fact that if the refractive index changes, the resonance condition will also change. The emphatic comment that the resonance condition is all that matters is off point. The illogic expressed here apparently is that the resonance condition is critical and if one way is known to change it then no other, different ways to change it are patentable. Ip teaches two ways it intentionally changes the resonance condition; Tachikawa teaches one, different way it intentionally suppress change in the resonance condition; and Applicant claims yet a different way to intentionally change the resonance condition.

The latest Action continues further by stating "*The paragraph concerning sealing the gas is for preventing wavelength drifting which means to stabilize the etalon resonance condition once the tuning is done.*" We agree. Ip and Applicant teach different ways to tune, and

preventing wavelength drift is generally a good thing. Tachikawa does not teach any specific way of tuning, instead teaching a way to minimize outside influences ability to cause wavelength drift. The real issue here is whether Applicant's dependent claims are allowable, and we urge that they are because their respective independent claims are allowable.

And the latest Action concludes:

> *Furthermore, the idea of tuning an etalon by changing refractive index of the gas filling the cavity of the etalon is extremely well known in the art. For instance, US patent issued to Basting et al teaches specifically a pressure-tuned etalon (6, Figure 4) wherein the etalon is tuned by changing the refractive index of the gas within the cavity of the etalon via changing the pressure of the cavity or medium, (please see column 7). This idea therefore is not a patentable idea.*

Respectfully, the first sentence does not state what Applicant is claiming. With respect to the rest, Bastings has not been employed in any rejection, and we agree that it will not support a proper rejection of Applicant's claimed invention. We were not aware of Bastings and we thank the Examiner for making it of record in this case.

CONCLUSION

Applicant has endeavored to put this case into complete condition for allowance. It is thought that the §102 rejections have been shown to be unfounded on the prior art references cited and that the §103 rejections have been completely rebutted. Applicant therefore asks that all objections and rejections now be withdrawn and that allowance of all claims presently in the case be granted.

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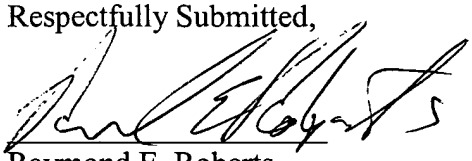

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